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ABSTRACT

The way that Open University students study technology (T100) and social science (D101) foundation courses was investigated using an inventory developed at Lancaster University. A comparison of study approaches of Open University and conventional university students, and data derived from student interviews were analyzed. The Lancaster inventory, which is appended, contains 16 scales that describe the four aspects of how students approach studying: meaning orientation, reproducing orientation, achieving orientation, and learning styles and pathologies. The way that recent research on student learning has been incorporated into the inventory is also addressed. The Open University study sample consisted of 153 T100 students and 204 D101 students. In addition to analysis of survey results, a small number of students were interviewed about their approaches to studying. Based on factor analysis, it was found that Open University and conventional university students approach studying in similar ways: the two main factors for both groups were "reproducing" and "meaning" orientations. However, D101 and T100 students are more similar in their study approaches than are conventional students of engineering and psychology. The evidence appears to suggest that Open University students have a greater interest in their studies and lower extrinsic motivation as well as a greater tendency towards a surface approach. (SW)

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STUDENTS' APROACHES TO STUDYING THE SOCIAL SCIENCE AND TECHNOLOGY FOUNDATION COURSES: PRELIMINARY STUDIES

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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ABSTRACT

This paper describes a research study which uses an inventory questionnaire to investigate how Open University students approach studying. It compares the findings from Open University students with those obtained with conventional university students. Data from student interviews are used to elaborate the findings derived from these quantitative studies.

SMG4 Approaches to Study, Quantitative and Qualitative Methodologies

Students' Approaches to Studying the Social Science & Technology Foundation Courses: Preliminary Studies

1. Introduction

Until recently if one wanted to compare the way students studied in different systems or on different courses, the choice of research tools was not very inspiring. Study habit inventories of various sorts have been used but the scores on such inventories are almost unrelated to academic performance (Entwistle & Wilson, 1977). However, in the last decade a number of research studies have identified various qualitative differences in how students' learn and have opened the way to measuring characteristics of studying which take a more realistic account of how students' approach studying. At Lancaster University an inventory has been developed which embodies the main distinctions identified in the qualitative studies of Pask (1976a & b) and Marton (1976a & b).

After a number of years development (Entwistle, Hanley & Hounsell, 1979), this inventory has now been used to characterise the approaches students take to studying in different departments and different subject areas (Ramsden & Entwistle, 1980). The important feature of this inventory is that its component scales measure differences between students which have been demonstrated to have a close relationship with learning outcomes. For example, the scale "deep approach" identifies characteristics of students' approach to learning tasks which have been found to be directly related to what students learn, (Marton & Saljo, 1976a & b).

In the study reported in this paper, the Lancaster inventory was used to identify the way Open University students study on the Technology (T100) and the Social Science (D101) Foundation courses.

The most interesting questions which this study addresses are:

(i) Do O.U. students differ in any important ways from conventional university students and if so, in what way?

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(ii) Do students study D101 differently from T100 and if so, what are the differences?

(iii) Do O.U. students study D101 and T100 in ways different to how conventional university students study social science and technology?

2. Development of the Approaches to Study Inventory

The most recent version of the Lancaster inventory contains sixteen scales (Fig. 1) which describe the four aspects of how students approach studying, meaning orientation, reproducing orientation, achieving orientation and learning styles and pathologies.

Approaches to Studying Inventory	
Meaning Orientation	Deep Approach Relating Ideas Use of Evidence Intrinsic Motivation
Reproducing Orientation	Surface Approach Syllabus-boundness Fear of Failure Extrinsic Motivation
Achievement Orientation	Strategic Approach Disorganised Study Methods Negative Attitudes to Studying Achievement Motivation
Learning Styles & Pathologies	Comprehension Learning Globetrotting Operation Learning Improvidence

Fig. 1

The complete inventory and the individual items which are embodied in the sixteen sub-scales are shown in Appendices I and II.

These scales will be briefly described to show how the recent research on student learning has been incorporated into the inventory.

Meaning orientation includes the scale "deep approach" which is derived from the research of Ference Marton & the Goteborg group.

Marton & Saljo (1976a & b) identified the qualitatively different ways students tackled a learning task. These approaches were described as a surface-level approach, when students saw learning primarily as a memorization task in contrast to a deep-level approach, when students were locking for personal meaning in their learning and attempting to relate ideas together. These different approaches to studying were directly related to the quality of the learning outcome, i.e. what students learnt.

For example, one item in the scale "deep-approach" is "When I'm tackling a new topic, I often ask myself questions about it which the new information should answer."

Similarly, items relating to students adopting a surface-level approach (see Appendix II) relate to a reproducing orientation. The scale "syllabus-boundness" is derived from the work of Parlett (1970) who contrasted students who adhered closely to the curriculum and assessment with those who tended to pursue their own interests. For example, one item in this scale is "I prefer courses to be clearly structured and highly organised."

Achievement orientation includes the scale "strategic approach" to take account of recent research on how assessment influences students' approaches to study, (Ramsden, 1979). Miller & Parlett (1974) described how students responded to the examination system in terms of cue-seeking and cue-consciousness. However, more recently, Ramsden (1979) has argued that "cue-seeking" identified by Parlett is only applicable to small, informal departments and suggests that the term strategic should be used for the general tendency of how students determine the implicit rules of the assessment system. For example, one item from this scale is "When I'm doing a TMA, I try to bear in mind exactly what that particular tutor seems to want".

The research of Pask into learning styles and pathologies has been incorporated into four scales in the present inventory.

Pask (1976a & b) identified different strategies in how students went about a particular learning task. It was found that some students adopted a holist strategy, when they had the intention of trying to build up a broad view of the subject matter and how it related to other topics, students used analogies and related material to personal experiences. The opposite strategy was termed serialist. Students were tackling the learning task by looking at component details in a logical sequential order and did not relate subject material to personal experiences. Pask has suggested that these specific learning strategies are related to learning styles to which students have some predisposition. These relatively consistent styles are described as comprehension learning, with the emphasis on specific details. Pask suggests that to achieve a full understanding of an academic topic both styles are required. Students who are unable to tackle studying in this flexible way exhibit learning pathologies. If comprehension learning is used exclusively, the attempt to relate ideas and search for an overview without supporting evidence and detail is termed globetrotting. Conversely, the exclusive reliance on operation learning is termed improvidence.

This research forms the basis to the scales comprehension and operation learning, globetrotting and improvidence. Details of the individual items are given in Appendix II.

What factors have emerged from this inventory which incorporates these recent research findings on student learning? The Lancaster inventory when used with conventional university students has repeatedly identified two main factors of meaning orientation and reproducing orientation. As Ramsden and Entwistle (1980) claim

> "It is now possible to speak with confidence about two principal orientations towards studying defined in terms of self-report inventories. The repeated analyses of our own inventory clearly indicate the stability and replicability of these two orientations."

i.e. meaning orientation and reproducing orientation.

Meaning Orientation is defined by the scales Deep Approach, Relating Ideas, Use of Evidence and Intrinsic Motivation, and Reproducing Orientation is defined by Surface Approach, Syllabus-Bound, Fear of Failure and Extrinsic Motivation.

3. Approaches to Study Inventory for O.U. Students - Method

To use the Lancaster inventory with Open University students a number of items have been modified so the wording makes sense for studying in the O.U. context. For example, an item "I like to be told precisely what to do in essays or other assignments" was changed to "I like to be told precisely what to do in T.M.A.s" and "Lecturers seem to delight in making the simple truth unnecessarily complicated" was changed to "The Units seem to delight in making the simple truth unnecessarily complicated".

The complete inventory and the sixteen sub-scales are shown in Appendices I & II.*

The modified form of the inventory was completed by students at two summer schools in 1979. This resulted in a sample of 153 T100 students and 204 D101 students, representing 78% and 85% of the total number of students at these summer schools, respectively.

Factor analysis of the data on the sixteen sub-scales was carried out with the SPSS programme (Nie et al, 1975), using alpha factor analysis with rotation to oblique simple structure. Analyses were carried out for T100 and D101 separately and also for the total sample.

The mean sub-scale scores were tabulated to allow comparison between T100 and D101 students and also with conventional university students.

Besides using the inventory, a small number of students were interviewed about their approaches to studying.

Two formats of interviews were used. Some students were asked general questions relating to how they approached studying, for example, how they had tackled the most recent assignment and the associated learning materials, the importance of assessment etc. In other interviews, each item of the inventory was used as an

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Footnote * We are very grateful to Noel Entwistle, Dai Hounsell and Paul Ramsden for permission to use the inventory and for their data obtained from conventional university students.

interview question. The purpose of the interviews was firstly, to obtain detailed descriptions of how students studied in order to assist the interpretation of the quantitative findings and secondly, as a check on the face validity of the inventory.

4. Results

Factor analysis is a procedure for determining the minimum number of dimensions or factors that can be considered to underlie a set of variables and the strength of the relationship between each variable and each factor.

Tables 1 and 2 show the factors which emerge from the analysis of D101 and T100 students and the combined student sample. The strength of the relationship between each scale and each factor is represented by the factor loadings i.e., the numbers in Tables 1 and 2.

For D101, Factor I consists of the scales relating to a reproducing orientation, with high loadings on the learning pathologies of globetrotting and improvidence and also operation learning, disorganised study and negative attitudes. Factor I for T100 is similar, although strategic approach is included but not globetrotting, negative attitudes or disorganised approach. Factor II for both D101 and T100 could be described as a meaning orientation and with a high loading on comprehension learning and also for D101 strategic approach. Factor III, for both groups, consists of the scales of achievement and extrinsic motivation. Although the eigen values are greater than one, examination of the correlation matrix shows a low correlation (0.27) between these two scales hence this factor is almost meaningless. Factor IV accounts for a very small percentage of the variance and again is unimportant.

The factor analysis of the combined sample of D101 and T100, Table 2, again shows two main factors. These can be regarded as the most important as they account for 22% and 17% of the total variance. Factor I relates to a Reproducing Orientation with components of disorganised approach, negative attitudes, operation learning and learning pathologies. Factor II consists of Meaning Orientation and with a high loading on comprehension learning.

Factor Analysis of Approaches to Studying Scales for D101 & T100 Students

Sub-Scale	D101 Factors [1]				T100 Factors [2]			
	I	II	III	IV	I	II	III	IV
Meaning Orientation								
Deep Approach		60				69		
Relating Ideas		63				60		
Use of Evidence		59				53		
Intrinsic Motivation		57				69		
Reproducing Orientation								
Surface Approach	64				60			38
Syllabus Bound	61				49			
Fear of Failure	62							43
Extrinsic Motivation			-50				-45	
Achieving Orientation								
Disorganised Approach	60							62
Strategic Approach		41			38			
Negative Attitudes to Study	53							
Achievement Motivation			-57				-46	
Styles & Pathologies								
Comprehension Learning		53				54		36
Globetrotting	74							67
Operation Learning	42			-43	56			
Improvidence	72			-35	31			

1. D101: N = 204; 52% variance explained.
   Factor IV Eigen Value $\lesssim$ 1.0 (i.e. correlations very low)

2. T100: N = 153; 53% variance explained
   Decimal points & loadings $\lesssim$ 0.30 omitted

Table 1

Factor Analysis of Approaches to Studying
for D101 + T100 Students

	Factors			
	I	II	III	IV
Meaning Orientation				
Deep Approach		63		
Relating Ideas		61		
Use of Evidence				
Intrinsic Motivation		64		
Reproducing Orientation				
Surface Approach	67			
Syllabus Bound	54			
Fear of Failure	59			
Extrinsic Motivation			-43	
Achieving Orientation				
Disorganised Approach	58			39
Strategic Approach				35
Negative Attitudes to Study	50			
Achievement Motivation			-63	
Styles & Pathologies				
Comprehension Learning		58		
Globetrotting	69			
Operation Learning	42			38
Improvidence	64			

D101 + T100: N = 357; 55% variance explained

Table 2

Factor Analysis of Approaches to Studying Scales for Conventional University Students (N = 2208)

Sub-Scale	Factors (51% variance explained) I	II	III	IV
Meaning Orientation				
Deep Approach	70			
Inter-relating Ideas	65			
Use of Evidence	54			
Intrinsic Motivation	72			
Reproducing Orientation				
Surface Approach		57	36	30
Syllabus-boundness	-41	58		
Fear of Failure		50	34	
Extrinsic Motivation		38		53
Achieving Orientation				
Strategic Approach				48
Disorganised Study Methods			50	
Negative Attitudes to Study	-39		52	
Achievement Motivation				45
Styles & Pathologies				
Comprehension Learning	55		30	
Globetrotting			52	
Operation Learning		62		44
Improvidence		68		

Decimal points and loadings less than .30 omitted

Table 3

Sub-Scale Scores for Approaches to Studying Inventory

for D101 & T100 Students

Sub-Scale	D101 Students (N=204) Mean	D101 Students (N=204) Standard Deviation	T100 Students (N=153) Mean	T100 Students (N=153) Standard Deviation	Difference in Means
Meaning Orientation					
Deep Approach	11.5	2.7	11.0	2.9	0.5
Relating Ideas	11.0	2.7	10.4	2.7	0.6
Use of Evidence	10.0	3.3	10.1	2.8	0.1
Intrinsic Motivation	10.9	3.0	9.8	3.2	1.1*
Reproducing Orientation					
Surface Approach	14.7	4.5	14.4	4.6	0.3
Syllabus Bound	8.5	2.7	9.0	2.2	0.5
Fear of Failure	5.8	3.3	4.9	2.9	0.7
Extrinsic Motivation	4.4	4.0	5.7	4.5	1.3*
Achieving Orientation					
Disorganised Approach	9.6	4.6	9.2	4.0	0.4
Strategic Approach	10.8	2.9	10.3	2.8	0.5
Negative Attitudes to Study	5.5	3.8	5.4	3.0	0.1
Achievement Motivation	8.6	3.6	9.1	3.4	0.5
Styles & Pathologies					
Comprehension Learning	8.8	3.7	7.4	3.8	1.4*
Globetrotting	8.5	3.4	8.4	3.2	0.1
Operation Learning	10.7	2.8	10.9	2.9	0.2
Improvidence	8.2	3.5	7.0	3.4	0.8

* Significant at 1% level

Table 4

Sub-Scale Scores for Approaches to Studying Inventory for Open University & Conventional University Students.

Sub-Scale	Open University 1		Conventional Universities 2		
	Mean	Standard Deviation	Mean	Standard Deviation	Difference in Means
Meaning Orientation					
Deep Approach	11.3	2.8	10.6	3.1	0.7*
Relating Ideas	10.7	2.7	10.0	3.1	0.7*
Use of Evidence	10.0	3.1	9.6	2.9	0.4
Intrinsic Motivation	10.5	3.1	8.3	3.9	2.2*
Reproducing Orientation					
Surface Approach	14.6	4.5	13.1	4.3	1.5*
Syllabus Bound	8.7	2.5	8.3	2.7	0.4*
Fear of Failure	5.4	3.1	5.9	3.1	0.5*
Extrinsic Motivation	4.9	4.3	5.9	4.4	1.0*
Achieving Orientation					
Disorganised Approach	9.4	4.3	9.5	4.1	0.1
Strategic Approach	10.6	2.9	10.2	3.0	0.4
Negative Attitudes to Study	5.5	3.5	5.6	4.0	0.1
Achievement Motivation	8.9	3.5	9.7	3.6	0.8*
Styles & Pathologies					
Comprehension Learning	8.2	3.8	8.6	3.9	0.4
Globetrotting	8.4	3.3	7.7	3.1	0.7*
Operation Learning	10.8	2.8	10.1	3.2	0.7*
Improvidence	7.7	3.5	7.6	3.3	0.1

1. Open University: D101 & T100 Foundation Students. N = 357.

2. Conventional Universities: 2nd year undergraduates in English, History, Economics, Psychology, Physics & Engineering. N = 2208.

*Significant at 1% level

Table 5

Sub-Scale Scores for Approaches to Studying Inventory for D101 Students & Psychology Students in Conventional Universities

Sub-Scale	D101 Students (N = 204) Mean	D101 Students (N = 204) Standard Deviation	Psychology Students (N = 402) Mean	Psychology Students (N = 402) Standard Deviation	Difference in Means
Meaning Orientation					
Deep Approach	11.5	2.7	10.8	2.8	0.7*
Relating Ideas	11.0	2.7	10.9	2.8	0.1
Use of Evidence	10.0	3.3	9.6	3.1	0.4
Intrinsic Motivation	10.9	3.0	9.3	3.6	1.6*
Reproducing Orientation					
Surface Approach	14.7	4.5	12.8	4.3	1.9*
Syllabus Bound	8.5	2.7	7.7	2.8	0.8*
Fear of Failure	5.8	3.3	5.9	3.1	0.1
Extrinsic Motivation	4.4	4.0	4.5	3.4	0.1
Achieving Orientation					
Disorganised Approach	9.6	4.6	9.9	4.2	0.3
Strategic Approach	10.8	2.9	10.2	3.0	0.6
Negative Attitudes to Study	5.5	3.8	5.3	3.8	0.2
Achievement Motivation	8.6	3.6	8.8	3.4	0.2
Styles & Pathologies					
Comprehension Learning	8.8	3.7	9.0	3.8	0.2
Globetrotting	8.5	3.4	8.2	2.9	0.3
Operation Learning	10.7	2.8	9.2	3.2	1.5*
Improvidence	8.2	3.5	7.4	3.3	0.8

* Significant at 1% level

Table 6

Sub-Scale Scores for Approaches to Studying Inventory for T100 Students & Engineering Students in Conventional Universities

Sub-Scale	T100 Students (N = 153)		Engineering Students (N = 508)		Difference in Means
	Mean	Standard Deviation	Mean	Standard Deviation	
Meaning Orientation					
Deep Approach	11.0	2.9	10.4	3.1	0.6
Relating Ideas	10.4	2.7	9.6	3.2	0.8*
Use of Evidence	10.1	2.8	9.9	3.0	0.2
Intrinsic Motivation	9.8	3.2	7.3	3.8	2.5*
Reproducing Orientation					
Surface Approach	14.4	4.6	13.2	4.4	1.2*
Syllabus Bound	9.0	2.2	9.2	2.2	0.2
Fear of Failure	4.9	2.9	6.2	2.9	1.3*
Extrinsic Motivation	5.7	4.5	8.0	4.0	2.3*
Achieving Orientation					
Disorganised Approach	9.2	4.0	9.8	4.2	0.6
Strategic Approach	10.3	2.8	10.5	3.0	0.2
Negative Attitudes to Study	5.4	3.0	5.4	4.0	0
Achievement Motivation	9.1	3.4	10.7	3.4	1.6*
Styles & Pathologies					
Comprehension Learning	7.4	3.8	8.0	3.8	0.6
Globetrotting	8.4	3.2	7.5	3.0	0.9*
Operation Learning	10.9	2.9	11.1	2.8	0.2
Improvidence	7.0	3.4	7.8	3.3	0.8*

* Significant at 1% level

Table 7

Sub-Scale Scores for Approaches to Studying Inventory

for Engineering & Psychology Students

in Conventional Universities

Sub-Scale	Engineering Students (N = 508)		Psychology Students (N = 402)		Difference in Means
	Mean	Standard Deviation	Mean	Standard Deviation	
Meaning Orientation					
Deep Approach	10.4	3.1	10.8	2.8	0.4
Relating Ideas	9.6	3.2	10.9	2.8	1.3*
Use of Evidence	9.9	3.0	9.6	3.1	0.3
Intrinsic Motivation	7.3	3.8	9.3	3.6	2.0*
Reproducing Orientation					
Surface Approach	13.2	4.4	12.8	4.3	0.4
Syllabus Bound	9.2	2.2	7.7	2.8	1.5*
Fear of Failure	6.2	2.9	5.9	3.1	0.3
Extrinsic Motivation	8.0	4.0	4.5	3.4	3.5*
Achieving Orientation					
Disorganised Approach	9.8	4.2	9.9	4.2	0.1
Strategic Approach	10.5	3.0	10.2	3.0	0.3
Negative Attitudes to Study	5.4	4.0	5.3	3.8	0.1
Achievement Motivation	10.7	3.4	8.8	3.4	1.9*
Styles & Pathologies					
Comprehension Learning	8.0	3.8	9.0	3.8	1.0*
Globetrotting	7.5	3.0	8.2	2.9	0.7*
Operation Learning	11.1	2.8	9.2	3.2	1.9*
Improvidence	7.8	3.3	7.4	3.3	0.4

* Significant at 1% level

Table 8

Table 3 shows the factor analysis results for the same approaches to studying inventory for conventional university students.

In comparing Tables 2 and 3 that is Open University students with conventional university do the same factors emerge? To what extent can O.U. students be described using the same constructs as conventional students.

In Table 3, Factor I is related to Meaning Orientation with a high loading on comprehension learning and also negative loadings on syllabus-boundness and negative attitudes to study. Factor II describes a Reproducing Orientation to study with loadings on operation learning and improvidence.

Thus for Open University and conventional university students the same two major factors emerge, namely Meaning Orientation and Reproducing Orientation although the order in which the factors occur (i.e. the % of variance explained by each factor) is slightly different.

The main difference between the factor analysis results in Tables 2 and 3 is that for conventional students reproducing orientation (Factor II), includes the scale extrinsic motivation, whereas for Open University students extrinsic motivation does not appear with reproducing orientation, (Factor I).

Tables 4-8 show the sub-scale scores for the various groups of students and differences in mean scores. Each table will be explained to indicate significant differences (1% level, 2 significance test) in the mean scores.

Table 4 shows the data for D101 and T100 students. D101 students score significantly higher than T100 on intrinsic motivation and comprehension learning whereas T100 students are higher than D101 students on extrinsic motivation.

Table 5 compares the scale scores for Open University students (T100 and D101) with second year conventional undergraduates. There are significant differences on ten of the sixteen scales. Looking at these differences qualitatively, rather than statistically, the major differences are that on intrinsic motivation and surface

approach, O.U. students' scores are higher than for conventional students and for extrinsic motivation, conventional students score higher than O.U. students.

Table 6 compares the scale scores for D101 students with psychology students in conventional universities. The significant differences, O.U. students greater than conventional students are on deep approach, intrinsic motivation, surface approach, syllabus-bound and operation learning.

Table 7 makes a similar comparison for T100 and engineering students. O.U. students are higher than engineering students on the scales relating ideas, intrinsic motivation, surface approach and globetrotting. Engineering students are higher than O.U. students on fear of failure, extrinsic motivation, achievement motivation and improvidence.

Table 8 compares scale scores for engineering and psychology students at conventional universities. The significant differences are that psychology students are higher than engineering students on intrinsic motivation, relating ideas, comprehension learning and globetrotting. Engineers are higher than psychologists on syllabus-bound, extrinsic motivation, achievement motivation and operation learning.

The differences in these scale scores and also factor analyses are discussed in the next section.

5. Discussion

The factor results in Tables 2 and 3 show how Open University and conventional university students approach studying in similar ways as the two main factors in each case are reproducing and meaning orientations with components of operation learning and comprehension learning. Although the order of the two factors is reversed, i.e. reproducing orientation explains more of the variance for O.U. students than for conventional university students, this may arise through making a comparison of O.U. foundation students with second-year undergraduates.

As the same two main factors emerge, the most important

conclusion of the present research is that all the background qualitative research on student learning from which the approaches to studying inventory was constructed is valid for describing student learning in the Open University.

The only important difference in the factor analyses is that for O.U. students, unlike conventional students, the scale extrinsic motivation is not related to a reproducing orientation to study.

What conclusions can be drawn by examining differences in scale scores. Table 4 shows how D101 and T100 students are similar except on the scales for intrinsic motivation, comprehension learning and extrinsic motivation. In contrast, for conventional students of engineering and psychology (Table 8), there are many differences in how they approach study.

The marked differences between departments of engineering and psychology presumably reflect the nature of the subject area and the methods of teaching and assessment of the particular department.

As D101 and T100 students appear to study in similar ways, this suggests that the influence of the Open University's "house-style" of course design at foundation level is so strong that it over-rides the demands of different subject areas.

In comparing O.U. students (T100 & D101) with conventional students (Table 5) it seems that the major differences relate to intrinsic and extrinsic motivation and surface approach. It suggests that O.U. students have a greater interest in the subjects they are studying and lower extrinsic motivation.

The greater tendency towards a surface approach to study is likely to be related to the demands of the O.U's distance teaching system.

How does the study of D101 and T100 compare to engineering and psychology in conventional universities?

In Table 6, attempting to place an interpretation on the significant differences, there is higher intrinsic motivation, for D101 students but their approach to study has a greater tendency towards operation learning and surface approach. This again may

be related to the demands of the O.U. teaching system.

Similarly, for T100 and engineering students (Table 7), O.U. students have a higher intrinsic motivation but appear to have a greater tendency to adopt a surface approach to studying, although the score on relating ideas is significantly higher for O.U. students.

For conventional university students of engineering, the higher scores on fear of failure, extrinsic motivation and achievement motivation are presumably related to the competitive pressures of conventional undergraduate study.

In summary, the scale scores suggest that O.U. students have a higher intrinsic motivation than conventional students. However, O.U. students approach to studying has a greater tendency towards a surface approach. This may be related to the O.U's "house-style" of course design with the emphasis on the "transmission" of knowledge from the course team to the students. Of course, the comparison of T100 and D101 students with second year undergraduates of psychology and engineering is somewhat crude. This could explain some of the differences in approaches to studying between groups of students.

However, the main conclusions of this study are derived from the factor analysis. For O.U. students the same two main factors of meaning orientation and reproducing orientation emerge as in studies on conventional university students. Thus, the background research on student learning used in constructing the approaches to studying inventory is valid for describing studying at the Open University.

6. Student Interviews

In the interviews which used the inventory items as a question format, students were able to make sense of these questions and answer in relation to their O.U. studies. This acts as some check on the face validity of the items in the inventory.

The main reason for the interviews was to enable further interpretation of the factor analysis results. Factor analysis identified two main orientations to study: a reproducing orientation

and a meaning orientation. How do these factors relate to how students' actually describe their studying in the interviews?

Here is one T100 student describing experiences of the course and his approach to studying:

I. How have you found the course so far then?

S. Mind boggling.

I. Can you say how?

S. Yea, I finished my apprenticeship 9 years ago and I work in metric, and I really thought that that made me a whiz-kid, because metric is metric, this is the thing and people still talk about feet and inches. I had never heard of joules or anything else. ---- now then the mechanics - I'm an engineer I know all about mechanics don't I. - no, I don't know anything about mechanics, you see what I'd learnt previously was opposite you know, different way of showing it different calculations, - engineering calculations for an apprentice are very narrow which I didn't realise before, the mechanics here was talking about pure mechanics, I thought I was going to skip a bit there, - really it brought me down.

I. When you first receive a block of material how do you start studying or what do you do with it?

S. Put it upstairs, because one of the complaints is that they send you so much literature it's not true, and it's not relevant, and I'm not one of those people who go along with the theory that you should do everything your own way, I like very disciplined ways of working, I like someone to tell me this is important, this is important, this is important and you know in my experience I want to be told what to learn or what's relevant. I'm scared that I'm going to miss something that's relevant.

I. From the course so far, can you say which bits you've learnt most from, or perhaps parts that you feel you've learnt least from?

S. We were talking about this today, I think that you've got to learn something from all of them because otherwise, simply you've got to learn from all of them if you're like me, you'll read from front to back.

I. You said about reading from front to back, can you explain?

S. When I first started it, it was simply a case of going upstairs closing the door, cup of coffee, packet of cigarettes, switching on the light and sitting down and doing it, that's blind reading, simply because I just read it and read it and read it.

These extracts from the interview give some depth to the notion of a reproducing orientation. The approach to study could be described as syllabus-bound, surface approach and seeing learning as a memorization task.

In contrast to this students' emphasis on a reproducing orientation to study, other students adopt very different approaches. The following quotations describe a meaning orientation.

Here is another T100 student talking about the correspondence text.

"I mean you get a whole page of text, and you know there might be just a sentence of a paragraph that really sums up quite a large section and then I underline that so when I scan through the unit I can pull out these things and then if I need to, or if I'm interested in that particular bit then I scan through the rest of that page until it focusses your attention when you're looking through some particular aspects of the unit."

In a similar way a D101 student described attempting to relate the course material to personal experience.

"I go through the Block - I read the thing pretty quickly and then go through it again and extract things which seem relevant ... if I can see that they have an application or are relevant to life as I see it, you know they strike a chord and I take notice."

Here is the same student explaining answering a TMA.

"I find the TMAs actually crystallise ideas a lot you know, I read a block and I end up with lots of what are essentially jumbled thoughts, I am not saying they don't make sense but there is no actual structure to them. You can see that one person says this and one person says that and how these different ideas relate to each other in my mind comes clear when I start writing about it. I try and construct a pattern I suppose and then fit different authors ideas into it and agree or disagree depending on the point I am trying to make."

This D101 student is adopting a very different and more sophisticated approach to studying than the first extract from the T100 student.

The interviews form a valuable complement to the factor analysis results as they provide students' descriptions of their studying to expand the meaning of the two factor, reproducing

orientation and meaning orientation.

The interviews have also served as pilot-studies for further work based entirely on interview techniques. In the extracts above, the qualitatively different approaches to study of deep-level and surface-level identified by Marton & Saljo (1976a) appear to be an important aspect of understanding how O.U. students learn.

8. Implications for Research into Student Learning in the Open University

The most important implication of the present study, as far as can be told from the approaches to studying inventory, is that the distinction between a reproducing orientation and a meaning orientation is as valid for Open University students as it is for conventional university students. This means that the research on learning used in developing the inventory i.e., the work of Pask, Marton and the Goteborg group, is applicable to how Open University students approach study. This background work can be used as the basis for further more detailed research and evaluation studies of student learning in the Open University.

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APPENDIX I

THE OPEN UNIVERSITY

Dear Student,

Approaches to Studying

We are beginning to understand the different ways in which Open University students tackle their courses. This questionnaire is a part of our research. If we are able to identify characteristically different approaches to study with this questionnaire, then we will be able to use it to look at the influence of aspects of course design (for example the assessment system, project-based courses etc) on the way you study.

Your answers to these questions will be kept in strictest confidence, and have nothing to do with your assessment on this course.

Please work through the questionnaire carefully, but quickly, giving your immediate answer to each item. Section A is concerned with background information. Section B contains statements about general approaches to studying and attitudes to various aspects of your work.

We recognise that this type of questionnaire does not allow you the freedom you might like to give a more personal and fuller reaction to some of the questions raised, so we have provided a space at the end for you to add any comments you feel we should consider.

Thank you for your cooperation and time.

Yours faithfully,

Graham Gibbs
Jane Henry
Alistair Morgan
Elizabeth Taylor

STUDY METHODS GROUP

SECTION A BACKGROUND DETAILS (1-3)

Please circle the number corresponding to your answer, or write it in where this is required.

Student Number H 0 1 8 1 4 3 6 (4-11)

What is the highest educational qualification you have obtained?

No formal qualifications	1	(12)
CSE, RSA or school leaving certificate in 1 or more subjects.	2	
GCE O level, SCE O grade, school certificate or equivalent in 1 - 4 subjects.	3	
GCE O level, SCE O grade, school certificate or equivalent in 5 or more subjects	4	
GCE A level, SCE H grade, higher school certificate or equivalent, in 1 subject	5	
GCE A level, SCE H grade, higher school certificate or equivalent, in 2 or more subjects.	(6)	
ONC or OND	7	
HNC or HND	8	
Teachers certificate or equivalent	9	
University diploma, degree or equivalent	0	

Have you studied any other Open University courses before this year? (13)

No	1
Yes - a Foundation course only	(2)
Yes - including a non-Foundation course	3

What is your highest TMA grade so far this year? (14)

A	(1)
B	2
C	3
D	4
F	5
R	6

What is your highest CMA grade so far this year? (15)

A	(1)
B	2
C	3
D	4
F	5
R	6

APPROACHES TO STUDYING

SECTION B

In this section we would like you to show whether you agree or disagree with each of the statements listed below. We are concerned here with your approaches to studying on this course.

Please circle the number beside each statement which best conforms with your view.

4 (✓✓) means Definitely agree

3 (✓) means Agree with reservations

1 (x) means Disagree with reservations

0 (xx) means Definitely disagree

2 (?) is only to be used if the item doesn't apply to you or if you find it impossible to give a definite answer.

If you accidentially circle two numbers to a question or leave a question out, we will have difficulty using any of your data, so please take care and check your answers.

		✓✓	✓	x	xx	?	
1.	I find it difficult to organise my study time effectively.	4	3	1	(0)	2	16
2.	I try to relate ideas in one topic to those in others, whenever possible.	4	(3)	1	0	2	17
3.	Although I have a fairly good general idea of many things, my knowledge of the details is rather weak.	4	3	(1)	0	2	18
4.	I enjoy competition: I find it stimulating.	4	(3)	1	0	2	19
5.	I usually set out to understand thoroughly the meaning of what I am asked to read.	4	(3)	1	0	2	20
6.	Ideas in the Units often set me off on long chains of thought of my own, only tenuously related to what I was reading.	4	3	1	(0)	2	21
7.	I chose my present course mainly to give me a chance of a really good job afterwards.	4	3	1	(0)	2	22
8.	Continuing my education was something which happened to me, rather than something I really wanted for myself.	4	3	1	(0)	2	23

		✓✓	✓	x	x	?	
9.	I like to be told precisely what to do in T.M.A's.	4	3	(1)	0	2	24
10.	I often find myself questioning things that I read in Units or hear on TV or Radio.	4	3	(1)	0	2	25
11.	I generally prefer to tackle each part of a topic or problem in order, working out one at a time.	4	3	(1)	0	2	26
12.	The continual pressure of work—assignments, deadlines and competition—often makes me tense and depressed.	4	3	1	(0)	2	27
13.	I find it difficult to "switch tracks" when working on a problem: I prefer to follow each line of thought as far as it will go.	4	3	1	(0)	2	28
14.	My habit of putting off work leaves me with far too much to do at the end of the year.	4	3	1	(0)	2	29
15.	It's important to me to do really well in the course.	4	(3)	1	0	2	30
16.	The Units seem to delight in making the simple truth unnecessarily complicated.	4	3	1	(0)	2	31
17.	Distractions make it difficult for me to do much effective work in the evenings.	4	3	1	(0)	2	32
18.	When I'm doing a TMA, I try to bear in mind exactly what that particular Tutor seems to want.	4	3	(1)	0	2	33
19.	I usually don't have time to think about the implications of what I have read.	4	3	1	(0)	2	34
20.	The Units and the Tutor sometimes give indications of what is likely to come up in exams, so I look out for what may be hints.	4	3	(1)	0	2	35
21.	In trying to understand a puzzling idea, I let my imagination wander freely to begin with, even if I don't seem to be much nearer a solution.	4	(3)	1	0	2	36
22.	My main reason for being in the Open University is that it will help me to get a better job.	4	3	1	(0)	2	37
23.	Often I find myself wondering whether the work I am doing here is really worthwhile.	4	3	1	(0)	2	38

		✓✓	✓	x	x	?	
24.	I generally put a lot of effort into trying to understand things which initially seem difficult.	4	(3)	1	0	2	39
25.	I prefer courses to be clearly structured and highly organised.	4	(3)	1	0	2	40
26.	A poor first answer in an exam makes me panic.	4	3	(1)	0	2	41
27.	I prefer to follow well tried approaches to problems rather than anything too adventurous.	4	(3)	1	0	2	42
28.	I'm rather slow at starting work in the evenings.	4	3	(1)	0	2	43
29.	In trying to understand new ideas, I often try to relate them to real life situations to which they might apply.	4	3	(1)	0	2	44
30.	When I'm reading I try to memorise important facts which may come in useful later.	4	(3)	1	0	2	45
31.	I like to play around with ideas of my own even if they don't get me very far.	4	(3)	1	0	2	46
32.	I chose this course more from the way it fits in with career plans than from my own interests.	4	3	1	(0)	2	47
33.	I am usually cautious in drawing conclusions unless they are well supported by evidence.	4	3	(1)	0	2	48
34.	When I'm tackling a new topic, I often ask myself questions about it which the new information should answer.	4	3	(1)	0	2	49
35.	I suppose I am more interested in the qualifications I'll get than in the courses I'm taking.	4	3	1	(0)	2	50
36.	Often I find I have to read things without having a chance to really understand them.	4	3	1	(0)	2	51
37.	If conditions aren't right for me to study, I generally manage to do something to change them.	4	3	1	(0)	2	52
38.	I like to try to work out several alternative ways of interpreting evidence or findings.	4	(3)	1	0	2	53

		✓✓	✓	x	xx	?	
39.	My main reason for being in the Open University is so that I can learn more about the subjects which really interest me.	4	(3)	1	0	2	54
40.	In trying to understand new topics, I often explain them to myself in ways that other people don't seem to follow.	4	3	(1)	0	2	55
41.	I find I have to concentrate on memorising a good deal of what we have to learn.	4	3	(1)	0	2	56
42.	It is important to me to do things better than my friends, if I possibly can.	4	3	(1)	0	2	57
43.	I find it better to start straight away with the details of a new topic and build up an overall picture in that way.	4	(3)	1	0	2	58
44.	Often when I'm reading books, the ideas produce vivid images which sometimes take on a life of their own.	4	3	(1)	0	2	59
45.	One way or another I manage to get hold of the books I need for studying.	(4)	3	1	0	2	60
46.	I often get criticised for introducing irrelevant material into my essays or tutorials.	4	3	1	(0)	2	61
47.	I find that studying academic topics can often be really exciting and gripping.	4	(3)	1	0	2	62
48.	The best way for me to understand what technical terms mean is to remember the text-book definitions.	4	(3)	1	0	2	63
49.	I certainly want to pass the next set of exams, but it doesn't really matter if I only just scrape through.	4	3	(1)	0	2	64
50.	I need to read around a subject pretty widely before I'm ready to put my ideas down on paper.	4	(3)	1	0	2	65
51.	Although I generally remember facts and details, I find it difficult to fit them together into an overall picture.	4	3	1	(0)	2	66
52.	I tend to read very little beyond what's required for completing assignments.	(4)	3	1	0	2	67
53.	Having to speak in tutorials is quite an ordeal for me.	4	(3)	1	0	2	68

		✓✓	✓	x	xx	?		
54	Puzzles or problems fascinate me, particularly where you have to work through the material to reach a logical conclusion.	4	3	(1)	0	2		69
55.	I spend a good deal of my spare time in finding out more about interesting topics which have been discussed in classes.	4	3	1	(0)	2		70
56.	I find it helpful to 'map out' a new topic for myself by seeing how the ideas fit together.	4	3	1	(0)	2		71
57.	I seem to be a bit too ready to jump to conclusions without waiting for all the evidence.	4	3	(1)	0	2		72
58.	I hate admitting defeat, even in trivial matters.	4	3	(1)	0	2		73
59.	I think it is important to look at problems rationally and logically without making intuitive jumps.	4	3	1	(0)	2		74
60.	I find I tend to remember things best if I concentrate on the order in which the Unit presented them.	4	3	(1)	0	2		75
61.	When I'm reading an article or research report, I generally examine the evidence carefully to decide whether the conclusion is justified.	4	(3)	1	0	2		76
62.	The Tutor seems to want me to be more adventurous in making use of my own ideas.	4	3	1	(0)	2		77
63.	When I look back, I sometimes wonder why I ever decided to join the Open University.	4	3	1	(0)	2		78
64.	I find academic topics so interesting, I should like to continue with them after I finish this course.	(4)	3	1	0	2		79
							1	80

We should like to thank you for sparing the time to fill in this rather long questionnaire. We recognise that it will have taken up a considerable amount of your time, but your responses will be valuable to us. If there are any aspects of studying we have not covered in the questionnaire, or any items you would like to comment on, please use the space below.

APPENDIX II

COMPOSITION OF SUB-SCALES IN THE APPROACHES TO STUDYING INVENTORY

Deep level approach

I usually set out to understand thoroughly the meaning of what I am asked to read.

I often find myself questioning things that I read in Units or hear on TV or Radio.

I generally put a lot of effort into trying to understand things which initially seem difficult.

When I'm tackling a new topic, I often ask myself questions about it which the new information should answer.

Relating ideas

I try to relate ideas in one subject to those in others, whenever possible.

In trying to understand new ideas, I often try to relate them to real life situations to which they might apply.

I need to read around a subject pretty widely before I'm ready to put my ideas down on paper.

I find it helpful to 'map out' a new topic for myself by seeing how the ideas fit together.

Use of evidence

I am usually cautious in drawing conclusions unless they are well supported by evidence.

In reporting practical work, I like to try to work out several alternative ways of interpreting the findings.

Puzzles or problems fascinate me, particularly where you have to work through the material to reach a logical conclusion.

When I'm reading an article or research report, I generally examine the evidence carefully to decide whether the conclusion is justified.

Intrinsic motivation

My main reason for being in the O.U. is so that I can learn more about the subjects which really interest me.

I find that studying academic topics can often be really exciting and gripping.

I spend a good deal of my spare time in finding out more about interesting topics which have been discussed in classes.

I find academic topics so interesting, I should like to continue with them after I finish this course.

Surface-level approach

The Units seem to delight in making the simple truth unnecessarily complicated.

I usually don't have time to think about the implications of what I have read.

When I'm reading I try to memorise important facts which may come in useful later.

Often I find I have to read things without having a chance to really understand them.

I find I have to concentrate on memorising a good deal of what we have to learn.

The best way for me to understand what technical terms mean is to remember the text-book definitions.

Syllabus-boundness

I like to be told precisely what to do in TMA's.

I prefer courses to be clearly structured and highly organised.

I tend to read very little beyond what's required for completing assignments.

Fear of failure

The continual pressure of work - assignments, deadlines and competition - often makes me tense and depressed.

A poor first answer in an exam makes me panic.

Having to speak in tutorials is quite an ordeal for me.

Extrinsic motivation

I chose my present courses mainly to give me a chance of a really good job afterwards.

My main reason for being in the O.U. is that it will help me to get a better job.

I generally choose courses more from the way they fit in with career plans than from my own interests.

I suppose I am more interested in the qualifications I'll get than in the courses I'm taking.

Disorganised approach

I find it difficult to organise my study time effectively.

My habit of putting off work leaves me with far too much to do at the end of term.

Distractions make it difficult for me to do much effective work in the evenings.

I'm rather slow at starting work in the evenings.

Strategic approach

When I'm doing a TMA, I try to bear in mind exactly what that particular tutor seems to want.

The Units and the tutor sometimes give indications of what is likely to come up in exams, so I look out for what may be hints.

If conditions aren't right for me to study, I generally manage to do something to change them.

One way or another I manage to get hold of the books I need for studying.

Negative attitudes

Continuing my education was something which happened to me, rather than something I really wanted for myself.

Often I find myself wondering whether the work I am doing here is really worthwhile.

I certainly want to pass the next set of exams, but it doesn't really matter if I only just scrape through.

When I look back, I sometimes wonder why I ever decided to join the O.U.

Achievement motivation

I enjoy competition: I find it stimulating.

It's important to me to do really well in the courses here.

It is important to me to do things better than my friends, if I possibly can.

I hate admitting defeat, even in trivial matters.

Comprehension learning

Ideas in the Units often set me off on long chains of thought of my own, only tenuously related to what I was reading.

In trying to understand a puzzling idea, I let my imagination wander freely to begin with, even if I don't seem to be much nearer a solution.

I like to play around with ideas of my own even if they don't get me very far.

Often when I'm reading books, the ideas produce vivid images which sometimes take on a life of their own.

Globetrotting

Although I have a fairly good general idea of many things, my knowledge of the details is rather weak.

In trying to understand new topics, I often explain them to myself in ways that other people don't seem to follow.

I often get criticised for introducing irrelevant material into my essays or tutorials.

I seem to be a bit too ready to jump to conclusions without waiting for all the evidence.

Operation learning

I generally prefer to tackle each part of a topic or problem in order, working out one at a time.

I prefer to follow well tried approaches to problems rather than anything too adventurous.

I find it better to start straight away with the details of a new topic and build up an overall picture in that way.

I think it is important to look at problems rationally and logically without making intuitive jumps.

Improvidence

I find it difficult to "switch tracks" when working on a problem: I prefer to follow each line of thought as far as it will go.

Although I generally remember facts and details, I find it difficult to fit them together into an overall picture.

I find I tend to remember things best if I concentrate on the order in which the Unit presented them.

The tutor seems to want me to be more adventurous in making use of my own ideas.